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Factsheet

EVENING PRIMROSE

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Evening Primrose is grown for its seed from which oil containing gamma linolenic acid (GLA) is extracted. The seed normally contains 20 to 25% oil, of which, 8 to 10% is GLA. The GLA rich oil is marketed principally as a health food that is used to treat various medical ailments. One should contact a physician as to the value of Evening Primrose oil.

Evening Primrose is a member of the Onethera family and is not related to the ornamental type primrose. The plant can be found growing wild across Ontario in waste areas, roadside and fence rows. It normally grows as a biennial, forming a rosette in the fall of the first year. In the second year, the plant bolts producing a branched flowering stalk 1 to 2 metres tall. The flowers begin to appear about the end of June. They are a slightly phosphorescent yellow colour, open in the evening and last only the one day. The flowering period lasts for 4 to 6 weeks with 2 to 5 flowers per stalk opening each day.



Figure 1. Flowering plant

There is, at present, only a small acreage of Evening Primrose production in Ontario. Crop yield can be quite variable ranging from only a few hundred kilograms to well over 1000 kg/ha. The inexperienced producer will likely have difficulty achieving maximum yield potential. A yield of at least 500 kg/ha is considered necessary for commercial production. Production should not be undertaken until arrangements have been made with a reliable buyer/processor for sale of the resulting crop. The buyer/processor is the most likely source of seed and, likewise, may provide a specific production recipe that must be followed.

SITE SELECTION

A fertile loam is considered the ideal soil type but the crop will grow well on a wide range of soils. The established crop has excellent tolerance to drought and, is adapted to sandy soils. Good drainage is critical for winter survival when the crop is being direct seeded in the fall. If the crop is being direct seeded, soils prone to crusting should be avoided.

ESTABLISHMENT

Evening Primrose can be direct seeded or transplanted. Direct seeding is cheaper, however, establishment problems and a higher potential for weed problems makes direct seeding more risky than transplanting.

(a) Direct Seeding — A precision seeder (Stanhay, Nibex, etc.) will be required for seeding which is normally carried out in early August using about 1 kilogram of seed per hectare. The high soil temperature at that time (25 degree C) seems to be helpful in overcoming seed dormancy. The lower soil temperature resulting from a later seeding date may contribute to uneven germination and small plants that are less tolerant of winter conditions. Early spring seeding is a possibility but plants are likely to be late in maturing and may produce low yields. There is also a risk that spring seeded plants may not bolt and remain in rosette form for the entire first season delaying harvest until the following season.

The seeding depth should not exceed 1.5 cm. Because low soil moisture conditions can severely reduce seed germination and seedling emergence, an irrigation system, if available, should be used to supply the moisture necessary for germination.

The optimum plant density appears to be about 30 plants per square metre. Extremely dense stands (150 plants per square metre) should be avoided because crowded plants

may not bolt. Dense stands may be thinned to achieve a population that will allow successful bolting. A thin stand, (5 to 10 plants per square metre) on the other hand, is of much less concern since the plant has the ability to produce many side branches.

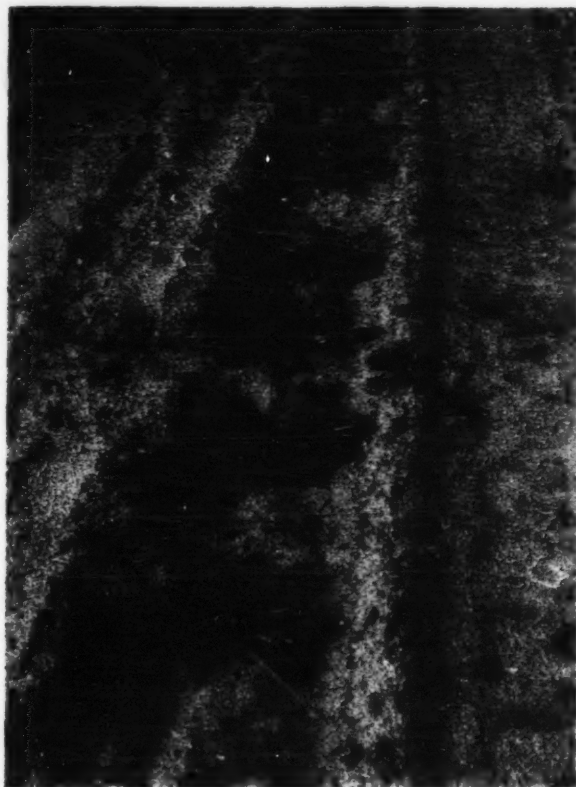


Figure 2. Transplants (Early June)

(b) Transplanting — The transplant method, although more costly, has certain advantages — the crop is more easily established, the desired population is more readily achieved and weed control problems are minimized as intra-row cultivation is possible.

Sixty to 80 days will be required to produce a seedling of sufficient size to be handled by a tobacco or vegetable transplanter. Seedlings that are started in a heated greenhouse about the end of February should be ready for transplanting to the field by early May. Early May transplanting is necessary in order to ensure that the plants will bolt and produce a crop in one growing season. The seedlings may be produced in beds or, as is usually the case, in trays. Following procedures recommended for the production of tobacco transplants should provide satisfactory Evening Primrose transplants. (See Ontario Ministry of Agriculture and Food Factsheets: *Producing Tobacco Transplants in Ontario*, Agdex 181/21, and *Culture of Tobacco Seedlings in Todd Cells*, Agdex 181.) A temperature of 25 degree C appears most satisfactory for germination and early seedling growth.



Figure 3. Bolting (Late June)

Fall transplanting in early to mid-September is also a distinct possibility, although not normally practised. The raising of seedlings for fall transplanting would be cheaper because the heated greenhouse would not be required. However, with fall transplanting or summer direct seeding, the harvest date will be moved ahead to the end of August or early September and swathing would be required to dry the crop down for combining.

The normal field spacing used for Evening Primrose transplants is 30 to 35 cm between plants in rows 91 to 107 cm apart. This will provide a population of 26,700 to 36,630 plants per hectare. Plant populations within this range will have little effect on yield.

FERTILIZATION

More studies are required to adequately define the fertilization needs of Evening Primrose. At the present time, not all agree on what procedures to follow. Thus, the buyer/processor may dictate specific guidelines that must be followed.

Nitrogen: Some may require that commercial fertilizers containing nitrogen not be used for Evening Primrose production. If no specific instructions are provided proceed as follows:

(a) Direct seeded — Apply 20 kg/ha actual nitrogen just prior to seeding, another 20 kg/ha actual nitrogen in the early spring as soon as growth begins and a final 50 kg/ha at bolting.

(b) Transplanted — Apply 20 kg/ha actual nitrogen at or just prior to transplanting and another 50 kg/ha at bolting.

Phosphate and Potash: Until such time as soil test requirement tables are established for Evening Primrose, follow those for Sorghum and Sunflower under Minor Crops in OMAF Publication 296 *Field Crop Recommendations*.

PESTS

There are, at present, no pesticides registered for use on this crop. Thus, the use of chemicals for the control of insects, diseases and weeds is prohibited.

Insects

Cutworms This insect may attack plant leaves early in the season.

Tarnished Plant Bugs and Aphids These sucking insects attack new growth areas. They will appear in late June or early July and continue feeding throughout the remainder of the season.

Acanthoscelidius alepholus (no common name) From early June until late August this tiny brown weevil (less than 1 mm in length) will attack the flower buds preventing seed pod development.

***Microlepidopterous* Insects** (no common names) Small creamy white larvae 2 - 5 mm in length attack the flower and seed pods reducing the seed yield.

Diseases

Botrytis This fungus may attack the new growth areas in early spring resulting in death of the plant. It is considered a potential problem on crops that are fall direct seeded or fall transplanted but not likely a problem on a spring transplanted crop.

Weeds

Weed control can only be obtained through cultivation and hoeing since there are no herbicides registered for this crop.

The crop must be kept free of weeds because weed seeds are difficult, if not impossible, to separate from the seed of Evening Primrose. Weed seeds will taint the oil making it unacceptable.

HARVESTING



Figure 4. Fully developed plants

The specific growth habit of the plant dictates that there will be a variance of seed maturity on each plant. The most mature seed pods will be found on the bottom and the least mature on the top. As individual pods ripen they begin to open and shed the seed. Thus, timing of harvest must be carefully chosen to minimize the losses and, at the same time, allow as much seed as possible to mature.

The best way to judge the stage of maturity of the crop is to open the pods progressively from the base of the stem towards the top. Physiologically mature seed at the bottom will be dark reddish brown to black in colour with a rough surface. As you move up the stem, the colour will become lighter. This marks the boundary between the mature and immature seed. Mature seed may be present in green pods since the drying of the pod is the last stage in the maturation process. The crop is normally considered ready for harvest when the bottom 5 to 6 seed pods are split and starting to shed seed and the upper third of the plant is a light brown colour.

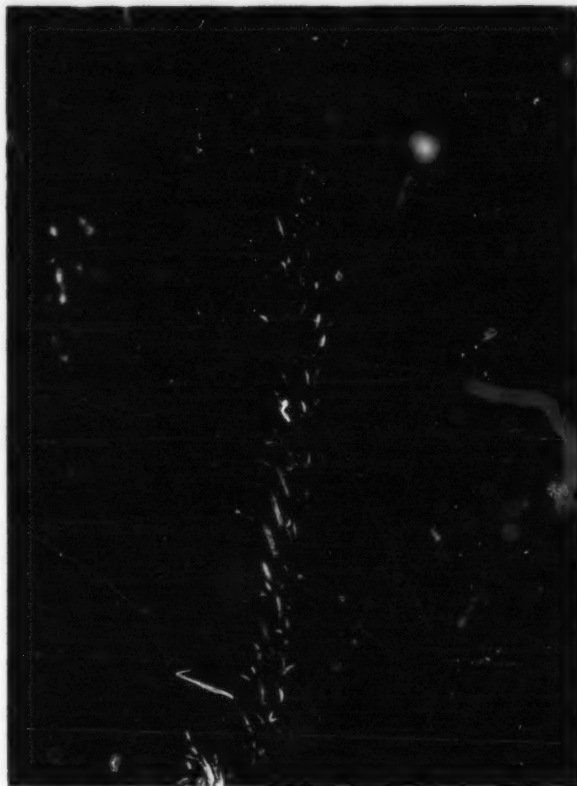


Figure 5. Mature seed stalk

A conventional combine harvester is used to harvest the crop. It must be tight and in good condition in order to minimize seed losses. A fall seeded crop would normally be harvested in late August. It must be swathed and allowed to dry for 5 to 7 days before combining. A spring transplanted crop will be later maturing and can likely be direct combined after the occurrence of a fall frost. The fall frost will aid in the drying down process of the plant. The seed should contain not more than 10 percent moisture for safe storage.

MARKETING

Evening Primrose is normally marketed directly to a pharmaceutical company. Anyone contemplating production should have definite market arrangements before growing the crop.

